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(54) Disc brakes

(57) To prevent rattling of a carrier plate 2, on one face of which a pad 3 of friction material is fixed, against guides for guiding the plate to and from the rotating disc, there is provided a wire spring 5, free ends of which press upwardly against a support structure, the spring pressing the plate 2 downwardly on to the guides. The wire spring 5 extends completely or partially around a lug 4 extending from the main body of the plate and part of the spring lies in a recess in that face of the lug 4 which is remote from the pad 3.

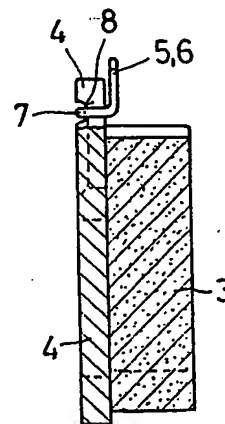
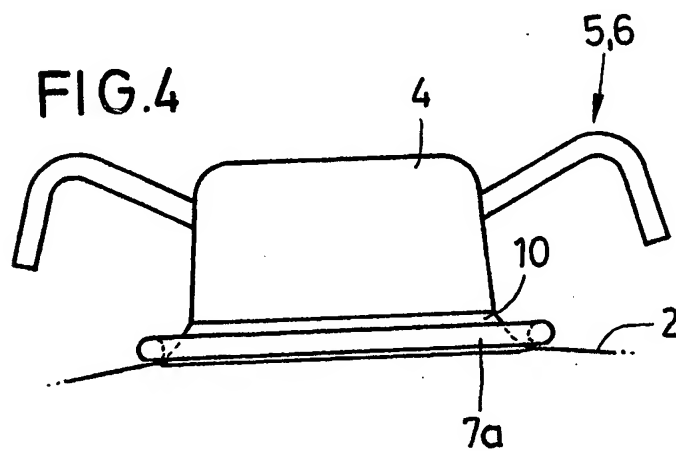
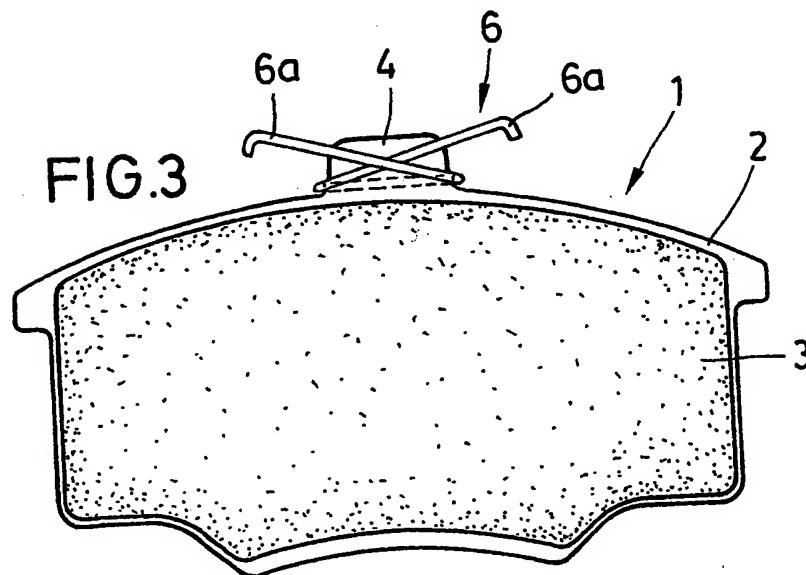
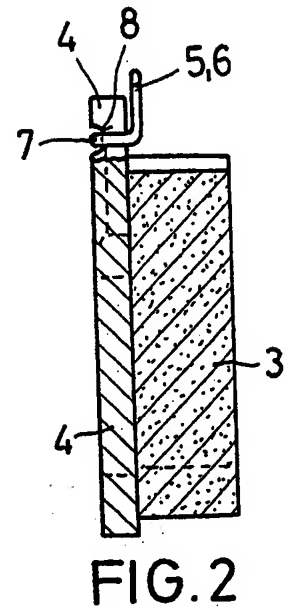
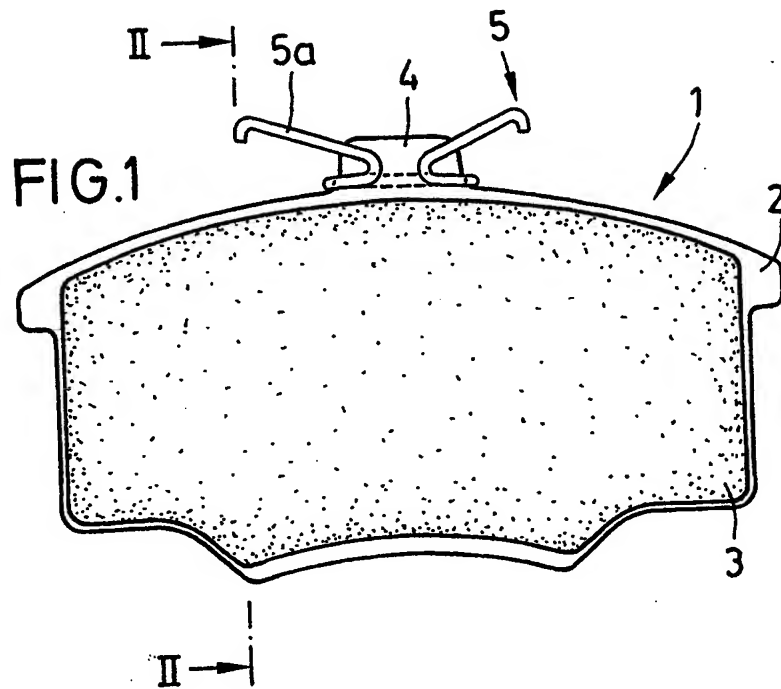


FIG. 2



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FIG. 5

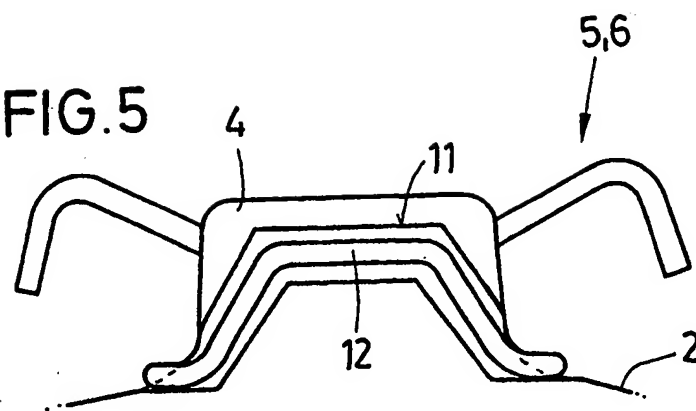


FIG. 6

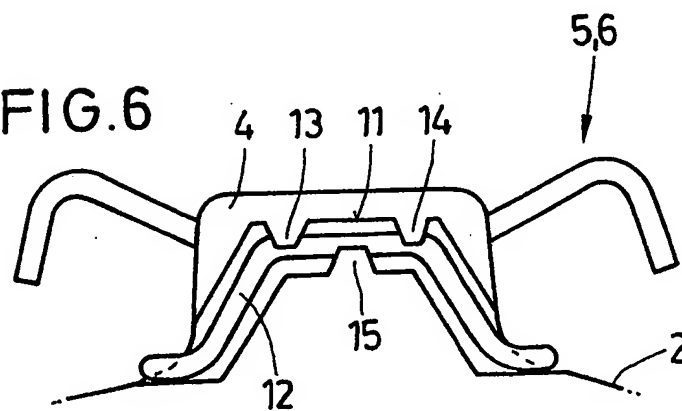
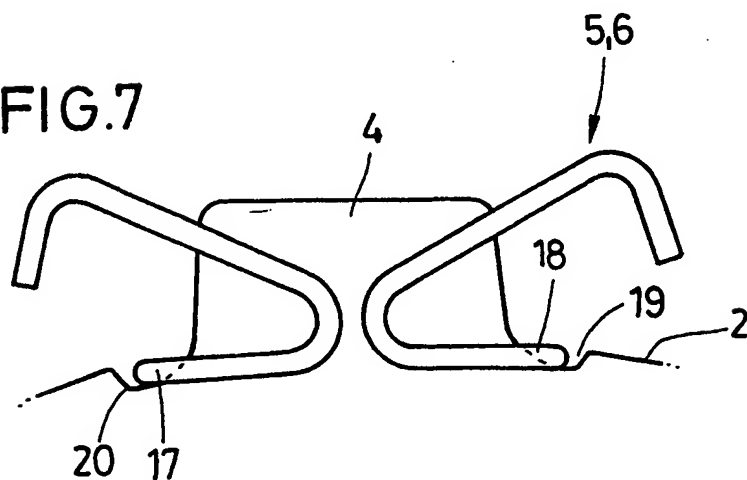


FIG. 7



SPECIFICATION

Disc brakes

- 5 United Kingdom Patent Specifications Nos. 1,533,976 and 2,036,211 disclose arrangements in which a wire spring is used to prevent rattling of a carrier plate, having one face partly covered with a lining of friction material, of a disc brake. The
- 10 spring in some of these arrangements is secured to a lug, extending from the centre of one edge of the carrier plate. The ends of two arms of the spring bear on the underside of a caliper member and the spring presses the carrier plate on to its
- 15 guide surfaces and opposes rattling there. In one such arrangement, illustrated in Figures 1 and 2 of United Kingdom Patent Specification No. 2,036,211, the wire spring is bent into a rectangle, parts of which extend across two opposite major faces of
- 20 the lug and around the two opposite sides or minor faces of the lug. At the two opposite sides of the lug the spring lies in undercuts but where the broad sides of the rectangular part of the spring extend across the major faces of the lug they do
- 25 not lie in any recesses and therefore they protrude from the lug, with the result that the broad side of the rectangular part of the spring which is remote from the friction material can extend into the path of the operating piston, which then does not en-
- 30 gage the carrier plate squarely.

- According to the invention, there is provided an assembly which is suitable for use in disc brakes, the assembly including a carrier plate having first and second opposite major faces and a protruding
- 35 lug extending from one side of the main body of the carrier plate in a direction away from the centre of the carrier plate, a pad of friction material secured to the first face of the plate but not extending over any substantial part of the lug and a
- 40 spring arrangement for limiting rattling of the plate when it is mounted on a support structure which includes guide surfaces for guiding the plate as it moves towards and away from the rotary disc, the spring arrangement including a wire spring with a
- 45 first portion lying in a recess in the second face of the plate, said recess extending from one side of the lug to the opposite side, second and third portions which extend around the opposite sides of the lug and are joined to opposite ends, respec-
- 50 tively, of the wire in the first portion, and fourth and fifth portions which extend towards one another from the second and third portions, respectively, adjacent the first face of the plate.

- Such an assembly can be so constructed that the
- 55 operating piston cannot engage the spring and therefore engages the carrier plate squarely and if one end of the spring breaks off the other end remains effective because the spring is held by virtue of its first portion being in the recess, which may
- 60 be in the form of a narrow groove.

- The type of impression or recesses in the projection of the bearing plate on the side turned towards the operating piston can be developed in a varied way. The impression and the like can run in
- 65 the projection of the bearing plate to the longitudi-

nal axis of the latter. With such a let-in arrangement of the back section of the spring into the bearing plate, already a sufficient reliable lodgement of the holding down spring at the bearing plate of the brake shoe results.

- 70 According to a further characteristic of the invention the impression and the like receiving the spring section can run curved in shape or forming an angle in the projection of the bearing plate. The
- 75 central part of the spring section can be high-drawn and run for example according to a trapeze shape. Thereby the lodgement of the holding down spring at the bearing plate is more definite and more reliable. A holding down function is guaran-
- 80 teed, even if a spring leg should break off.

- According to another characteristic of the invention, the spring section lying in the impression is secured against sliding away outwards, in that securing organs are provided for the spring section
- 85 concerned. Advantageously such a securing can consist of a caulking of the bearing plates material over the spring section.

- According to a further characteristic of the invention the side loop-parts of the spring loop encompassing the projection of the bearing plate can be arranged in depressions. Hereby the lodgement of the holding down spring at the projection of the bearing plate is improved and made more reliable.

- The invention is explained supported by the exemplary embodiments portrayed in the drawing:
- 95 *Figure 1* and 2 show an embodiment of a brake shoe with holding down spring arrangement with a high-drawn centre projection of the bearing plate in view and in section according to the line II-II in *Figure 1* diagrammatically.

- 100 *Figure 3* portrays another development of the holding down spring.

- Figure 4* shows a spring arrangement on the operating side of the bearing plate on a greater scale and in diagram.

- 105 *Figure 5* and 6 illustrate further embodiments of the development of the impression in the centre projection of the bearing plate on a greater scale and in diagram.

- 110 *Figure 7* illustrates an advantageous situation of the spring section guided around the centre projection of the bearing plate in front view, diagrammatically.

- The brake shoe 1 for a partial lining disc brake
- 115 shows a bearing plate 2 and a friction lining pressed on the latter. A holding down spring 5 of wire, arranged on the high-drawn centre projection 4 of the bearing plate 2, which (spring) supports itself on the underside of a saddle (not portrayed), is
- 120 guided around the plate projection 4 and possesses on the side of the bearing plate turned towards the friction lining 3, legs 5a running outwards and upwards. With the embodiment in *Figure 3* the legs 6a of the holding down spring 6
- 125 cross over each other on the side turned towards the friction lining 3 at the projection 4. In both cases the holding down spring 5, 6 shows a section 7 on the side of the bearing plate 2 turned towards the operating piston, which (section) comes
- 130 to lie in a recess 8, so that this spring section does

not jut out over the back surface of the bearing plate 2.

In Figures 4 to 6 the arrangement of the holding down spring 5 or 6 on the side of the bearing plate 2 turned towards the operating piston for the brake shoe is illustrated. With the development in Figure 4 the backward spring section 7a is located in a groove-shaped impression 10 at the base of the projection 4 of the bearing plate 2. The course of the groove-shaped impression 10 is drawn out and lies parallel to the longitudinal axis of the bearing plate 2. With the example in Figure 5 the groove-shaped impression 11 for the corresponding spring section 12 is designed in an angular shape. Advantageous is a trapeze-shaped course for the spring section 12 and the groove-shaped impression 11 belonging thereto. Figure 6 corresponds essentially to the portrayal in Figure 5. The lying in of the spring section 12 in the groove-shaped impression 11 belonging thereto is further ensured by additional means. With the portrayed example the securing consists of caulking 13, 14, 15 of the bearing plate material over the spring section 12. The impression receiving the spring section is partially closed by the overlapping by means of the caulked parts, in order to make the lodgement of the holding down spring at the projection of the bearing plate quite secure.

Figure 7 shows an arrangement of the holding down spring 5 or 6, with which the spring parts 17, 18 encircling the projection 4 sideways are carried in depressions 19, 20. Thereby an improved lodgement of the holding down spring around the high-drawn centre projections 4 of the bearing is achieved.

Important combinations of features of the device

1. Brake shoe, consisting of a bearing plate with a friction lining pressed on and a holding down spring of wire, with which the bearing plate possesses a high-drawn lining-free projection, which the wire spring encompasses with an open or closed loop, in which case the free legs of the wire spring are directed outwards and upwards and support themselves against a brake saddle, characterised in that, the spring section (7, 7a, 12) lies embedded on the operating side of the brake shoe in impressions (8, 10, 11) or recesses of the projection (4) of the bearing plate (2).

2. Brake shoe according to combination 1, characterised in that, the impression (7, 10) and the like runs in the projection (4) drawn out to the longitudinal axis of the bearing plate.

3. Brake shoe according to combination 1, characterised in that, the impression and the like runs curved in shape or forming an angle in the projection (4) of the bearing plate.

4. Brake shoe according to combination 1, characterised in that, the impression (11) and the like shows a trapeze shape in the projection (4).

5. Brake shoe according to one of combinations 1 to 4, characterised in that, the spring section (7, 7a, 12) is secured in the impression (10, 11) against sliding away outwards; and in that, the securing consists of a caulking (13, 14, 15) of the bearing

plate material over the spring section (12).

6. Brake shoe according to one of combinations 1-5, characterised in that, the side parts (17, 18) of the spring loop encompassing the projection (4) are arranged in depressions (19, 20).

CLAIMS

1. An assembly which is suitable for use in disc brakes, the assembly including a carrier plate having first and second opposite major faces and a protruding lug extending from one side of the main body of the carrier plate in a direction away from the centre of the carrier plate, a pad of friction material secured to the first face of the plate but not extending over any substantial part of the lug and a spring arrangement for limiting rattling of the plate when it is mounted on a support structure which includes guide surfaces for guiding the plate as it moves towards and away from the rotary disc, the spring arrangement including a wire spring with a first portion lying in a recess in the second face of the plate, said recess extending from one side of the lug to the opposite side, second and third portions which extend around the opposite sides of the lug and are joined to opposite ends, respectively, of the wire in the first portion, and fourth and fifth portions which extend towards one another from the second and third portions, respectively, adjacent the first face of the plate.

2. An assembly according to claim 1 in which the fourth and fifth portions of the spring do not reach each other and are followed by sixth and seventh portions, respectively, which extend away from one another, at acute angles to the fourth and fifth portions, respectively, towards the free ends of the spring.

3. An assembly according to claim 1 in which the carrier plate is elongate and the fourth and fifth portions of the spring are inclined by acute angles to the length direction of the carrier plate and they cross one another.

4. An assembly according to any preceding claim in which the recess is a long and narrow groove.

5. An assembly according to claim 4 in which the carrier plate is elongate and the groove is parallel to the length direction of the carrier plate.

6. An assembly according to claim 4 in which the groove is curved or has at least two straight portions inclined to one another.

7. An assembly according to claim 4 in which the groove consists of three straight portions, two end ones of which are inclined by more than 90° to a central one.

8. An assembly according to any preceding claim in which, in order to prevent the first portion of the spring from coming out of the recess, at least one ear on the carrier plate has been bent over the wire after its insertion in the recess.

9. An assembly according to any preceding claim in which the second and third portions of the wire spring lie in recesses in the carrier plate.

10. An assembly according to claim 9 in which

the recesses which receive the second and third portions of the wire spring are formed in the main body of the carrier plate adjacent the sides of the lug.

- 5 11. An assembly which is suitable for use in disc brakes and is substantially as hereinbefore described with reference to Figures 1 and 2 or any one of Figures 3 to 7 of the accompanying drawings.
- 10 12. A disc brake including an assembly in accordance with any preceding claim and a support structure supporting it, the free ends of the wire spring pressing on the support structure and the wire spring urging the carrier plate against guide
- 15 surfaces to limit rattling.